

AIR TURBINE STARTER HAVING A FORCE BALANCED, PRESSURE ENERGIZED, WEIGHTED CHECK VALVE

ABSTRACT OF THE DISCLOSURE

An air turbine starter is provided that includes a check valve assembly for placement between a first environment, at least a portion of which is at a first pressure (P_1), and a second environment, at least a portion of which is at a second pressure (P_2), wherein the difference between the first and second pressures generate a pressure force (F_p). The check valve assembly comprises a valve element disposed between the valve seat and the valve body, the valve element capable of being acted upon by a gravitational force (F_w), a viscous force of the fluid to be communicated between the gearbox assembly and the starter housing (F_v), a buoyancy force of the valve element (F_b), and the pressure force on the valve element (F_p), the valve element further configured to translate axially to a closed position when $P_2 < P_1$ and $F_w < F_v + F_b + F_p$.